

POWER PLANT HISTORIC PRODUCTION DATA

**Prepared by:
Michael Magaletti
Bill Wood
Robert Grow**

**California Energy Commission
October 22, 1998**

**Submitted for Consideration at the
Ad Hoc Information Committee Workshop
on November 3, 1998**

CEC Docket 97-DC&CR-1

DISCLAIMER: This report is a result of work by the staff of the California Energy Commission. The views it contains are those of the authors and may not necessarily represent those of the State of California or the California Energy Commission.

I. OVERVIEW

A. Purpose

This paper is issued in support of the November 3, 1998, workshop on Generator Historic Production Data. The workshop seeks to facilitate understanding of data necessary to carry out Energy Commission mandates, encourage discussion of alternative sources of data and alternative methods of collection to help the California Energy Commission's Ad Hoc Information Committee (the Committee) can make an informed decision as to the most appropriate source of data balancing cost, feasibility, practicality, equity and usefulness.

A. Committee Directions

B.1 General Directions

In the Order for the Second Phase of the Data Collection Rulemaking¹ and the Scoping Report Describing Resumption of the Rulemaking (the Scoping Report)², the Committee expressed an intent to review the Energy Commission's data collection activities, evaluate data necessary, and determine the most appropriate means of collection. The Committee stated that sufficient data should be acquired to carry out the Energy Commission's legal mandates and acknowledged a continued need for historical power plant generation and fuel consumption data.³

The Committee has asked that four broad issues be addressed in every workshop:

- What level of detailed information is needed to permit the CEC to model the electricity system for the types of issues that we anticipate analyzing?
- Where and under what conditions should existing requirements on utilities be reduced in light of their revised role within California's energy markets?
- To what extent should new entities enabled by electricity restructuring legislation to operate within California's energy markets be required to provide data comparable to those entities pre-existing in the market that already provide data?
- Where are alternative data collection means feasible and practically available to also reduce the burden of direct reporting by existing utilities or new independent generators and Energy Service Providers?

B.2. Framework for Regulatory Review of Generator Historic Production Data

The Committee has provided some additional direction for the topic of Generator Historic Production Data by identifying specific issues it intends to review before making recommendations to the Commission.⁴ These include:

- Which historical generation data are necessary and useful for modeling the electricity system and assessing the issues important to policy makers?

¹ Ad Hoc Information Committee, Docket 97-DC&CR-1, July 30, 1998.

² Docket 97-DC&CR-1, July 28, 1998, page 4.

³ Ibid., page 19. "We are open to other changes which meet our general goal of ensuring appropriate data from generators to adequately model the system for the trend identification, price projections, environmental impact reviews, and market assessments we will be reporting to policy makers."

⁴ Ibid., page 17.

- To what extent can existing the Quarterly Fuel and Energy Report (QFER) requirement be revised to apply equally to all generators regardless of ownership or regulatory status?
- To what extent should existing QFER reporting requirements be revised to reflect the new entities and transactions resulting from restructuring;
- How can the Energy Commission ensure that the QFER system continues to properly provide generation data for use by staff and the public as the three major investor-owned utilities divest themselves of various generating facilities?
- To what extent will the historical generation data provided to system operators from scheduling coordinators under the requirements of SB 1305 be adequate for purposes of calculating annual Net System Power and verifying claims of specific purchases?
- To what extent are QFER filings essential to provide a substantial amount of the historical generation data the Energy Commission needs to fulfill its duties under SB 1305, e.g., to calculate the annual Net System Power and to verify claims of specific purchases?
- To what extent will generators supplying power for specific purchases (SB 1305) or for credits through the Energy Commission's renewable customer credit program (SB 90) file duplicate information through the specific reporting requirements established by the Energy Commission to operate these programs?

C. Generator Historic Production Data Background

C.1. Reasons for Collecting Data

The Energy Commission collects and uses historical power plant generation and fuel consumption data to support its monitoring and policy development functions. In particular, such data are crucial to:

- analyze historical trends in the electricity industry, such as tracking changes in:
 - fuel use, e.g., the growth in the use of natural gas for fuel in existing and new power plants
 - power plant ownership, e.g., the growth in non-utility generation
 - generation technologies, e.g., the growth in renewable generation
 - sources of California's electrical energy (see Attachment A), e.g., trends in the use of out-of-state generation sources
- provide accurate information on the state's current and historic electricity resource mix, fuel dependency and utility service area generation emissions profiles;
- prepare and publish summaries of baseline power plant production data by fuel type
- forecast natural gas demand from electric generation as a key input in forecasting natural gas prices
- forecast electricity prices as a key input to forecasting electricity demand
- adjust utility electricity sales for self-generated electricity as a key input to forecasting electricity demand

With the passage of Senate Bill 1305 (Stats. 1997, Ch. 796, §1) in 1997, two more requirements must be supported by the collection of historic generation data:

- development of the State's annual Net System Power fuel distribution (see Attachment B), and
- verification of energy service providers' claims of specific purchases.

C.2. Level of Detail

The level of detail of historical generation and fuel consumption data required to complete the most analytically demanding of these activities is generally as follows:

- Energy production must be in megawatt-hours (or kilowatt-hours) by facility for the reporting period
- Capacity must be in megawatts (or kilowatts) at system peak by facility for the reporting period
- Fuel type must be by facility and at least in the categories required by SB 1305 (see Attachment A)
- Fuel Consumption must be in British thermal units by facility for the reporting period by type of fuel
- Fuel Costs must be in dollars per unit of fuel for the reporting period by type of fuel.

The monthly reporting period was chosen because it is the period that best captures seasonal variations in power plant production and natural gas prices, and can easily be grouped to produce annual totals.

II. SOURCES OF GENERATOR HISTORIC PRODUCTION DATA

A. Electrical Generation and Capacity

In the past historic power plant generation and fuel consumption data have been collected primarily through the Quarterly Fuel and Energy Reporting (QFER) process, as supplemented by the California Public Utility Commission's Utility Monthly Fuel and Operations Report (UMFOR), various Energy Information Administration (EIA) forms, and Federal Energy Regulatory Commission (FERC) Form 1. Power plant generation and fuel type data collected under the auspices of SB 1305 will be due for the first time in February 1999.

A.1. Sources of Monthly Generation Data For All But SB 1305 Requirements

The major source for historical generation has been QFER Form 1 (utility-owned generation), Form 2 (interutility transactions), Form 2A (utility purchases from Qualifying Facilities), Form 11 (generation not sold to a utility, i.e. self-generation) and Form 13 (utility estimates of self-generation). The specific historical generation data collected in each form are listed in Table 1.

The California Public Utilities Commission's (CPUC) Utility Monthly Fuels and Operations Report (UMFOR) has been used as a substitute source for San Diego Gas & Electric's QFER Form 1 data. UMFOR contains monthly data on station generation, fuel consumption, operational costs and inter-utility transactions. UMFOR's content is analogous to a combined QFER Form 1,

Form 2 and Form 2a (see Table 1) but with information on costs and substantially more detail⁵. It is unclear whether the investor-owned utilities (in particular, the three utility distribution companies) currently filing UMFOR data will continue to do so in the future⁶.

EIA Form 412 “Annual Report of Public Electric Utilities,” EIA Form 861 “Annual Electric Utility Report,” and FERC Form 1 have been used as secondary sources for information on interutility transactions.

⁵ For instance UMFOR contains utility generation by plant whereas QFER Form 1 contains utility generation by technology.

⁶ Starting in 1982 CPUC staff requested that investor-owned utilities file these reports in support of the Commission’s annual Energy Cost Adjustment Clause proceedings. Since UMFORs are filed by CPUC staff request, the requirement that they be filed can be terminated easily.

Table 1
Summary of QFER Current Historical Power Plant Generation Reporting Requirements

Entity	Reporting Variables	Sub-Categories	Reporting Frequency	QFER Form #
Electric Utility	Monthly generation in MWh	By fuel/technology type	Quarterly	1
Electric Utility	Monthly peak capacity in MW	By fuel/technology type	Quarterly	1
Electric Utility	Monthly purchases of energy (firm & non-firm) in MWh from other utilities	By region & entity type	Quarterly	2
Electric Utility	Monthly purchases of capacity (on peak) in MW from other utilities	By region & entity type	Quarterly	2
Electric Utility	Monthly sales of energy (firm & non-firm) in MWh from other utilities	By region & entity type	Quarterly	2
Electric Utility	monthly sales of capacity (on peak) in MW from other utilities	By region & entity type	Quarterly	2
Electric Utility	monthly purchases of energy in MWh from non-utilities	By contract type & fuel/technology type	Quarterly	2A ⁷
Electric Utility	monthly purchases of capacity in MW (on peak) from non-utilities	By contract type & fuel/technology type	Quarterly	2A
non-utility generators	monthly generation in MWh	By facility	Annually	11 ⁸
non-utility generators	capacity in operation at time of system peak	By facility	Annually	11
Electric Utility	estimates of total self-generation for facilities smaller than 10 MW	By SIC codes	Annually	13
Electric Utility	list of non-utility generators required to report under Form 11	By facility	Annually	15 ⁹

⁷ QFER Form 2A (Electric Utility Monthly Purchases from Non-Utilities) is designed to cover power purchased by electric utilities in the aggregate from qualifying facilities, small power producers, electric wholesale generators and/or independent power producers.

⁸ QFER Form 11 (Non Utility Use of Generated Electricity) is required of non utility power plants with an installed generating capacity of at least 10 megawatts that either use fossil fuels or do not sell all of their output to an electric utility. As utility fossil fuel-fired plants are divested they will no longer be reported to the QFER system under Form 1. Instead, they will file data under Form 11.

A.2. Sources of Monthly Generation Data For SB 1305 Requirements

SB 1305 requires electricity retailers to disclose their sources of electricity to consumers and requires generators to report their production of electricity to the Energy Commission, through system operators. The generator disclosures allow the Energy Commission to verify the sources claimed by retailers and allow the Energy Commission to calculate “Net System Power”. Net System Power refers to the electricity that consumers receive by default if they decline to choose electricity derived from specific sources. SB 1305 requires the Energy Commission to calculate the components of Net System Power annually to help consumers may make informed choices when they select electricity products. Energy Commission regulations require retailers to display the components of their electricity products side by side with the components of Net System Power.

To calculate the fuel type (by percent of generation) of the electricity consumed in California (Net System Power), all of the generation in the state for the year must be recorded and sorted by fuel type. Then, exports of electricity must be subtracted out and imports of electricity added in. Additionally, self-generation must be subtracted out, requiring a complete record of the state’s electrical generation and a record of the individual transactions that crossed California’s borders.

A.2.a Generator Reporting and Energy Commission Access

Section 398.3. of SB 1305 requires each generator that provides meter data to a system operator to report to the system operator its:

- electricity generated in kilowatt-hours (kWh) by hour by generator,
- the fuel type or fuel types, and
- fuel consumption by fuel type by month on an historical recorded quarterly basis. Facilities using only one fuel type may satisfy this requirement by reporting fuel type only. Facilities using more than one fuel type may report the fuel consumed as a percentage of electricity generated.

The data that system operators allow the Energy Commission to access as required by Section 398.3 are:

- Facility’s kWh/hr generated quarterly if the facility is located in-state,
- Facility’s Fuel Type or Types if the facility is located in-state, and
- kWh/hr generated by out-of-state generation to the extent it is metered.

Although the Energy Commission is authorized to access this information and use it in calculating Net System Power and verifying claims of specific purchases, the Commission must treat all these data as trade secrets and may only release them in an aggregated form.

The data that generators not metered by System Operators or Scheduling Coordinators but involved in Specific Purchases must report electronically to the Energy Commission by March 1st as required by Section 1392 of the Act’s regulations are:

⁹ QFER Form 15 (Electric Utility Annual List of Self-Generating Facilities) provides a check that all the facilities required to file under Form 11 do so.

- Generator's name,
- Facility's name,
- Facility's ID number;
- Facility's location,
- Facility's kWh/hr generated in the previous calendar year, and
- Facility's Fuel Type or Types for the previous calendar year.

The same section gives the Energy Commission authority to access this data. The data are not expected to include fuel consumption in the sense of quantity of fuel consumed, because the section allows single fuel generators to report fuel type only, and allows dual fuel generators to report in terms of percentages of the electricity generated.

Energy Commission staff has established communications with the major system operators (as defined by SB 1305) in the state. These include the Independent System Operator and the large municipal utilities. The system operators will collect the meter data that is available to them, but it appears that many generators will not be metered by the system operators, especially those smaller than 10 MW. See Attachment C for a chart showing the numbers and total capacity of power plants at four different sizes (< 1 MW, < 10 MW, < 50 MW, and \geq 50 MW).

The remaining generators must still be accounted for in the Net System Power calculation, so they will have to be individually notified. They will have a choice of reporting through system operators or directly to the Energy Commission. Reporting hour by hour generation will be optional. Only month by month generation and fuel type(s) will be required. Because SB 1305 is a new program, the extent and quality of generator participation remains unknown at this time. Building a reliable and comprehensive data collection system may take a few years.

For out-of-state generators, the Energy Commission can only access the electricity generation data in kilowatt-hours by hour at the point at which out-of-state generation is metered, to the extent the information has been submitted to a system operator. In practice, again with reference to the ISO's situation, this means that only information on net flows is available to the Energy Commission. Individual transactions are not included. See Table 3 for a more detailed description of these "gaps."

SB 1305's data recording requirements and method of collection do not result in a process that is sufficient to provide the data needed to produce the annual Net System Power Report.

A.2.b Comparison of Reported Data and Consumer Claims

The Energy Commission must issue a report on or before October 15, 1999, and annually thereafter, comparing:

- disclosures made to consumers by retail suppliers as called for in Section 398.4 with
- data and information transmitted to the Energy Commission by retail suppliers as required in Section 398.5, and with
- generator information accessed by the Energy Commission through the system operators as called for in Section 398.3.

The data retail suppliers transmit to the Energy Commission by offering annually on March 1st as required by Section 398.5 are:

- kWh purchased by generator and fuel type during the previous calendar year
- kWh sold at retail
- Disclosures made to their customers by offering:
 - Specific Purchases, if any:
 - Projected for current calendar year at least quarterly
 - Actual for the previous calendar year annually on or before April 15th
 - Net System Power for the previous calendar year at least quarterly

B. Natural Gas

Data on annual California natural gas consumption, as for California electricity generation, are needed to prepare the base case natural gas energy balance in the North American Regional Gas (NARG) model. This information sets the stage for the analysis using NARG to prepare annual forecasted supply and associated California border natural gas prices. Power plant natural gas usage becomes important because it represents a large fraction of the annual consumption of natural gas in California.

Historical annual burner tip prices (delivered price to the point of consumption), annual consumption price, monthly supply, and monthly price information are used for other analyses. Forecasted annual burner tip prices for a number of sectors, including electricity generation, are prepared “off-line” based partially on the border supply and price results from the NARG model. Historical burner tip prices are contrasted with the forecasted prices to determine if they make sense, given the current natural gas market conditions and any price shifts that are forecasted from the NARG analysis. To provide this real world comparison for the NARG model results current monthly and seasonal market conditions are needed. Thus, monthly natural gas price and consumption data must be obtained.

To support the electricity market analysis, it is necessary to provide a forecasted monthly natural gas price forecast for electricity generation. The Energy Commission only forecasts annual prices in the NARG model, so factors which allocate the annual forecast to monthly prices as a post-processing step have been developed. These allocation factors are based on historically reported monthly natural gas consumption and burner tip price for electricity generation in each of the gas utility service areas.

It should be pointed out that electricity supply and price forecasts are not done in a vacuum. Electricity generation demand for natural gas is only one component of the Fuel Resources Office natural gas forecasting effort. Other components of this effort include:

- Determining natural gas price trends by sector for each natural gas utility service area.
Currently these forecasts are prepared on a long term basis, but may soon be provided on a short term basis.
- Assessing impacts of new technology developments on natural gas supply and price.
- Determining sources or origins of future California supply.

- Preparing natural gas basin analysis to assist in evaluating future supply to California, support pipeline analysis, and aid the natural gas market analysis.
- Assessing in-state natural gas market conditions.
- Evaluating the national/continental natural gas market in relationship to California.
- Analyzing competitive market behavior in relationship to such factors as additional pipeline capacity availability, more or less natural gas resources, cheaper resources, increased demand, environmental regulations, etc.
- Preparing natural gas analysis to support numerous energy policy evaluations and development.
- Providing by natural gas utility service area information on natural gas markets to consultants, industry, governmental agencies as well as current and potential energy consumers and suppliers. Such information includes:
 - historical and forecasted natural gas supply and price by source
 - historical and forecasted demand and price by end-use sector
 - pipeline flow analysis to determine need for new capacity, assist in market analysis, and evaluate impacts of proposed new pipelines on California supply and price
 - results of national/continental natural gas market analysis in relationship to California and competitive market behavior

B.1. Sources of Monthly Consumption and Price Data

The information presented in this section of the paper should be considered in concert with a much more detailed discussion of the problems and potential alternatives in obtaining complete coverage of all sizes of self-generating fossil-fueled power plants. This discussion is contained in staff's September 15, 1998, paper, *Self-Generation Reporting / Estimation Alternatives*.

Monthly historical natural gas supplies and prices for electricity generation are obtained from two sources: the Energy Commission's QFER Form 3 and Form 12 (see Table 2 for a more detailed list of the data collected in those QFER forms), and the CPUC's Utility Monthly Fuels and Operations Report (UMFOR) which is used as source material for forecasting future allocations of natural gas supplies between end-use sectors. Forecasted annual natural gas prices for electricity generation are based on these monthly supply and price data.

Annual natural gas consumption data for electricity generation are obtained from a number of sources. QFER Forms 3, 12 and 14 provide the historical consumption data. The California Gas Report is a source for annual projections of consumption by end use. The Annual Report of the State Oil and Gas Supervisor is used to provide projections of natural gas production in California.

Table 2
Summary of QFER Current Historical Power Plant Fuel Consumption Reporting Requirements

Entity	Reporting Variables	Sub-Categories	Reporting Frequency	QFER Form #
Electric Utility	monthly fossil fuel use	by fuel type	Quarterly	3 ¹⁰
Electric Utility	monthly fossil fuel use cost in "\$/unit avg. burned"	by fuel type	Quarterly	3
Electric Utility	monthly fossil fuel supply status – receipts, consumption, other	by fuel type	Quarterly	3
non-utility generators	monthly fossil fuel use	by facility & SIC	Annually	12
Gas Utility	estimated natural gas use in therms by non-utility generation	Number of facilities by SIC code	Annually	14

Natural gas fuel prices for cogeneration and self generation are not reported to the Energy Commission. It has been assumed that all electricity generation in a specific natural gas service area will have the same natural gas price.

¹⁰ QFER Form 3 (Utility Annual Estimate of Gas Use for Self Generation) is designed to cover natural gas-fired non-utility generators that do not file under QFER Form 12. Energy Commission staff use these estimates to adjust natural gas price forecast & electricity price forecast input assumptions.

Table 3
SB 1305: ACCESS TO GENERATOR DATA FROM THE ISO

Specified Data	Use or Purpose of Data Collection	Proposed Data Collection Method	Source/Location of Data	Gap(s) From Spec
Net System Power (kWh/hr; metered generator for unit)	<ol style="list-style-type: none"> SB 1305 requires generators to report hourly data to the ISO or other system operators (Sec. 398.3) Data (annual, aggregated by fuel type) expected to be used in the calculation of Net System Power. Data (annual, aggregated by fuel type) used to compare against annual retail supplier data in preparing the annual comparison report, subject to confidentiality restrictions (Sec. 398.5 (e)) Unit-specific data (annual and possibly monthly) may be required to confirm or otherwise verify specific purchase or environmental claims, subject to confidentiality restrictions. 	<ol style="list-style-type: none"> Collect electronically from ISO/system operators or directly from generators where necessary. Aggregate hourly kWh/hr generator data up to monthly and/or annual kWh numbers per generator for comparison report, confirmation purposes, and an annual fuel type number for net system power reporting. 	<ol style="list-style-type: none"> All individual generators have hourly data. SCs will have data for SC-metered generators. ISO will have data for ISO-metered units or facilities. The ISO should be able to obtain most, but not all, generator-specific data from SC-metered units connected to the grid. NOTE: Other system operators and municipal utilities that do not utilize the ISO (metered subsystems) are expected to have hourly unit-specific data, including any associated with special purchases. 	<ol style="list-style-type: none"> ISO v for units size. ISO v have data at distri A gen would be to track i
Net System Power (Out-of-state); available at the ISO (which out-of-state is metered injection points).	<ol style="list-style-type: none"> SB 1305 gives the CEC access to hourly data from out-of-state sources to the extent the information has been submitted to the ISO/system operator. These data are required to produce the products in #2 and #3 above. 	<ol style="list-style-type: none"> Collect electronically from ISO/System Operators. Disaggregate with voluntary cooperation of ISO or SCs. Disaggregate using CEC knowledge of out-of-state mix. 	The designated Scheduling Coordinator(s) for the grid injection points will have this information at various levels of aggregation.	<p>Most of t reported be unit- c but rather number r injection</p> <p>A genera necessary individu;</p>
Net System Power (Fuel type per generator meter data).	<ol style="list-style-type: none"> Data expected to be used to establish the mix of fuel source types for calculating Net System Power and verifying fuel type of generating sources associated with specific purchases. This information is expected to be needed for comparing fuel source claims by retail suppliers in the context of the annual comparison report and, potentially, the verification of individual specific purchases or environmental claims. 	To be decided. Fuel type identifier could be collected electronically with generation data, as part of generator ID, for units that use one fuel type.	All generators have this data.	<p>The ISO this data agreeme no mecha the data t metered t</p> <p>Scheduli not prese data.</p> <p>Not avail generator control a</p>
Net System Power (ASSUMPTION: Net System Power per unit or Net System Power has dual fuel type, the monthly Net System Power to each fuel type historical Net System Power).	Use of data not specified in SB 1305. Since CEC does not have access to this data, it has no expected use for reporting or verification activities.	Format for reporting not specified in proposed regulations.	All generators have this data.	<p>The ISO this data agreeme no mecha the data t metered t</p> <p>Scheduli not prese data.</p>

				Not avail generator control a
--	--	--	--	-------------------------------------

ATTACHMENT A

Table J-11 from the California Statistical Abstract

CALIFORNIA ELECTRICAL ENERGY GENERATION, 1988 TO 1997								
TOTAL PRODUCTION, BY RESOURCE TYPE								
(Millions of kilowatt hours)								
	1988	1989	1990	1991	1992	1993	1994	
Total Generation:	232,926	238,567	252,355	242,343	245,535	242,026	257,799	
Hydroelectric	26,692	32,742	26,092	23,244	22,373	41,595	26,706	
Nuclear	35,481	33,803	36,586	37,167	38,622	36,579	38,828	
Coal	21,034	19,702	21,402	23,442	32,435	22,907	25,095	
Oil	8,158	9,275	4,449	523	107	2,085	1,954	
Gas	74,221	78,916	76,082	75,828	87,032	70,715	95,025	
Geothermal	14,194	15,247	16,038	15,566	16,491	15,770	15,573	
Organic Waste	4,092	5,204	6,644	7,312	7,362	5,760	7,173	
Wind	1,824	2,139	2,418	2,669	2,707	2,867	3,293	
Solar	315	471	681	719	700	857	798	
Other	4	4	4	0	2	0	0	
Energy Imports	46,911	41,064	61,959	55,873	37,704	42,892	43,354	
Utility-owned: Total	154,013	155,081	139,309	131,866	153,350	154,639	157,589	
Hydroelectric	26,259	32,096	25,612	22,728	22,033	40,440	25,024	
Nuclear	35,481	33,803	36,586	37,167	38,622	36,579	38,828	
Coal	19,243	17,223	17,710	20,392	28,806	20,358	22,440	
Oil	8,158	9,275	4,449	523	107	2,085	1,954	
Gas	53,040	52,249	45,262	42,353	54,338	46,738	61,474	
Geothermal	11,827	10,429	9,684	8,700	9,441	8,435	7,842	
Organic waste	0	0	0	0	0	0	0	
Wind	0	0	0	0	0	1	26	
Solar	1	2	2	3	1	3	1	
Other	4	4	4	0	2	0	0	
Nonutility: Total	32,002	42,422	51,087	54,604	54,481	44,496	56,856	
Hydroelectric	433	646	480	516	340	1,155	1,682	
Coal	1,791	2,479	3,692	3,050	3,629	2,549	2,655	
Gas	21,181	26,667	30,820	33,475	32,694	23,977	33,550	
Geothermal	2,367	4,818	6,354	6,866	7,050	7,334	7,731	
Organic waste	4,092	5,204	6,644	7,312	7,362	5,760	7,173	
Wind	1,824	2,139	2,418	2,669	2,707	2,867	3,268	

Solar	314	469	679	716	699	854	797
Other	0	0	0	0	0	0	0
Energy imports: Total	46,911	41,064	61,959	55,873	37,704	42,892	43,354
Pacific Northwest	19,893	17,739	31,665	28,819	19,600	15,466	15,315
Pacific Southwest	27,018	23,325	30,294	27,054	18,104	27,426	28,040

ATTACHMENT B

Final 1997 Net System Power

Final Net System Power Calculation for 1997		
<u>Fuel Type</u>	<u>GigaWatt-hours</u>	<u>Net System Power</u>
Coal	51,201	20.9%
Large Hydroelectric	56,323	23.1%
Natural Gas	73,269	30.0%
Nuclear	36,741	15.1%
Other	173	0.1%
Eligible Renewables:		10.8%
Biomass & Waste	5,373	2.2%
Geothermal	11,950	4.9%
Sm Hydro (≤ 30 MW)	5,395	2.2%
Solar	810	0.3%
Wind	2,739	1.1%
Total:		100%

ATTACHMENT C

Distribution of California Power Plants by Capacity

